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Delay

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4/30/59Final Report on "Spring Study" under R. O. 3INTRODUCTION

Under a preceding task (Contract RD 45, R. O. 22, 16 September 1955 to 15 March 1956), the complete destruction of the Mk 2 Delay Unit was studied employing various materials for body, striker and spring, and testing their physical and chemical decay under influence of the incendiary or explosive attachment.

Under this assignment, one hundred phosphor-bronze springs, especially designed for the Mk 2 Delay were purchased from the Muehlhausen Spring Division of Rockwell & Axle Co. Since tests showed their usability in the Mk 2 Delay as well as their essential destruction by fire and explosion, a long-term study was agreed upon to determine the amount of set or fatigue under prolonged static load conditions. This task was awarded under a work order (Contract RD 45, R. O. 3, Letter of 28 June 1956) but the preparation of the springs in compressing them in striker assembly was begun under the preceding task in October 1955. The testing was completed in October 1957 but additional springs were kept in ambient storage until April 1959 and measurements were taken then.

Six sets of ten springs each were assembled into a test fixture resembling closely the actual striker assembly of the Mk 2 unit and the free strength and free length for each spring were checked before and after the treatment which consisted of the following -- one condition for each group:



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- a. temperature and humidity cycle according to
"JAN Cycle" MIL-STD-304.
- b. storage at 75°F for one month
three months
six months
twelve months
twenty four months

After each period, a retest of strength and length was performed. There were no significant changes on any one test. A final recheck was made after an additional year using unused, fully compressed springs and springs which had been compressed before. The nominal length of the springs was 49/64" \pm 0.039" or minimum 0.727", maximum 0.805". The following were the results:

uncompressed	formerly compressed	continuously compressed
.773	.761	.733
.764	.742	.729
.764	.752	.750
.767	.752	.726
.771	.747	.729
average .768	.751	.733

This test confirms the former findings. The springs which had been compressed for three years differed by -0.035 in. or -4½% from the original, the figure lying within the permissible tolerances.

After completion of the two year period, five of the springs, stored in compressed state were assembled in Mk 2 Delay Units and tested using the acetone capsule with the Incendiary Head (P-Unit). All five fired satisfactorily.

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Another test was set up using M34 detonators with Mk 2 Delay Units but for obscure reason, the firing did not take place and the test items had to be destroyed by extraneous means.

*They will test 10 assembly compressed against
M41 detonators as in M34's*

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